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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,716	04/13/2004	Ichiro Kataoka	03500.018070	2994

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EXAMINER	
SALZMAN, KOURTNEY R	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/822,716	KATAOKA ET AL.	
	Examiner	Art Unit	
	KOURTNEY R. SALZMAN	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed February 14, 2008 has been entered and fully considered.

2. Claims 1-7 remain pending in the application.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 3, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over KATAOKA et al (US 5,530,264), in view of INOUE et al (Youichi Inoue, Yasuhiro Yoshimura, Yukiko Ikeda, Akiomi Kohno, Ultra-hydrophobic fluorine polymer by Ar-ion bombardment, Colloids and Surfaces B: Biointerfaces Volume 19, Issue 3, , 30 December 2000, Pages 257-261.)

KATAOKA et al teaches, in column 5, lines 12-21, "an improved photoelectric conversion device and improved photoelectric conversion module each having a multi-layer protecting member including at least a transparent resin layer disposed on the light incident side of the photovoltaic element and a transparent surface protective layer disposed at the outer-most surface outside said resin layer wherein said transparent resin layer is comprised of a specific fluorine-containing polymer resin". The limitations of claim 1, describing a solar cell element and the front surface member, herein disclosed as a transparent surface protective layer, are clearly taught. Regarding the final limitation of claim 1, KATAOKA et al teaches the use of "discharging treatment" to be "conducted for

the face of the transparent surface protective layer" in column 9, lines 43-48, as a discharge treatment.

KATAOKA et al teaches the application the discharge treatment, but fails to teach the application of the treatment outermost light incidence side of the polymer film.

INOUE et al teaches the use of ion bombardment discharge treatment on a fluoride polymer sheet or layer in abstract.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to apply a discharge treatment as in INOUE et al to the outer surface of the similar film of KATAOKA et al because INOUE et al teaches the use of the discharge treatment to improve hydrophobicity to very high levels. (INOUE et al conclusion) The ability of the fluoride polymer to repel water improves its weatherability and increases functionality of the solar cell. It would be obvious to place the polymer face with increased weatherability protection in direct contact with the weather on the light incidence side. Increased performance in wet or adverse weather conditions is a long felt need in the art of solar cell technology.

Regarding claim 3, INOUE et al teaches the discharge treatment to cause a surface roughness as shown in figure 1 and discussed in section 3.1 Effects of ion bombardment conditions on surface morphology.

Regarding claim 5, KATAOKA et al discusses the contact surface of the protective layer as an advantage in column 9, lines 22-26. KATAOKA et al states as one advantage to designing the transparent surface layer disposed on the fluororesin layer as "when the transparent surface protective layer is comprised of a resin film of 70° or above in surface contact angle against water, there can be attain a photoelectric conversion device or module having a desirable surface capable of preventing deposition with pollutants".

Regarding claim 6, KATAOKA et al specifically lists possible materials to be used as the fluorine-containing polymer. In column 3, lines 3-6, KATAOKA et al states material examples of "the fluorine-containing polymer thin film as the transparent surface protective film are fluororesin films such as ETFE (ethylene-tetrafluoroethylene copolymer film)..."

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over KATAOKA et al (US 5,530,264) and INOUE et al (Youichi Inoue, Yasuhiro Yoshimura, Yukiko Ikeda, Akiomi Kohno, Ultra-hydrophobic fluorine polymer by Ar-ion bombardment, Colloids and Surfaces B: Biointerfaces Volume 19, Issue 3, 30

December 2000, Pages 257-261., as applied to claim 1 above, in view of MONTMARQUET (US 4,731,156).

KATAOKA et al and INOUE et al teach the subject matter of claim 1, as shown in the above rejection, including the discharge treatment of the surface of the photoelectric device.

KATAOKA et al fails to disclose the environment in which such a surface treatment takes place.

MONTMARQUET teaches "a process for modifying the surface of fluoropolymers" (column 1, lines 7 and 8) "whenever it is desired to stick something to such materials" (column 1, lines 59-61). MONTMARQUET describes his method as what is "commonly known as plasma etching or reactive ion etching"(column 4, lines 52-54) a process comprising "placing said fluoropolymer in a sealed chamber, introducing a combination of gases including oxygen and ammonia gas into said chamber within a predetermined pressure range, creating a plasma discharge in said chamber during the introduction of gases for an interval sufficient to remove a substantial amount of fluorine from the surface of said fluoropolymer"(column 3, lines 23-34). While oxygen and ammonia gas are described here, MONTMARQUET continues by stating, in column 4, lines 59-64, the "common gases for etching include oxygen, fluorine, chlorine and gases having fluorine and chlorine atoms such as carbon

tetrafluoride or carbon tetrachloride. These gases are used alone or in mixtures that may also contain argon, nitrogen or carbon dioxide."

At the time of invention, one of ordinary skill in the art would have been motivated to modify the fluorine-containing polymer layer of KATAOKA et al to include the polymer treatment of MONTMARQUET because both seek to modify the surface for maximum adhesion. KATAOKA et al uses the discharge treatment in order for the "transparent surface protective layer to be joined to the coating material composed of the foregoing specific fluororesin for the photoelectric conversion element", as described in column 9, lines 43-49. MONTMARQUET states the process he describes can be used "whenever it is desired to stick something to such materials as fluoropolymers" in column 1, lines 59-61. Therefore, due to common motivation and teachings, it would have been obvious to one of ordinary skill in the art to combine the teachings of KATAOKA et al and MONTMARQUET to produce increased fluoropolymer adhesion.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over KATAOKA et al (US 5,530,264) and INOUE et al (Youichi Inoue, Yasuhiro Yoshimura, Yukiko Ikeda, Akiomi Kohno, Ultra-hydrophobic fluorine polymer by Ar-ion bombardment, Colloids and Surfaces B: Biointerfaces Volume 19, Issue 3, , 30 December 2000, Pages 257-261.), as applied to claims 1 and 3, in view of TAWADA et al (JP 2000-058892) and in further view of NAKAMURA et al (US 6,127,623).

KATAOKA et al and INOUE et al teach the subject matter of claims 1 and 3, as shown in the above rejection.

Regarding the first limitation of claim 4 containing the mean height, TAWADA et al teaches, in paragraph 12 of the detailed description of the invention section, "these solar cells have a concavo-convex vertical interval in within the limits which is 0.01-2 micrometers". This corresponds to the average range described in the pending claim of the instant application.

It would have been obvious to one of ordinary skill in the art to roughen the fluoropolymer surface of KATAOKA et al and INOUE et al so that said surface has an unevenness as described in both KATAOKA et al (column 12, lines 33-35), INOUE et al (figure 1) and TAWADA et al in order to improve efficiency of the photoelectric devices, a desire of nearly all solar cell manufacturing as taught by TAWADA et al. (paragraph 4 of the description of prior art section).

Neither KATAOKA et al, INOUE et al or TAWADA et al address the limits of height disclosed in the second limitation of claim 4.

Regarding the second limitation of claim 4 containing the maximum height range, NAKAMURA et al discloses a solar cell comprising a light-receptive face with a "projection depth d2 (see FIG. 9(e)) of...above 5 micrometers to about 15

micrometers" in column 2, lines 37-38. Figure 9(e) also shows a high-efficiency solar cell with an uneven top surface on the light-incidence side. NAKAMURA et al uses this to reduce the reflection off the surface (column 1, lines 39-44).

Therefore, at the time of invention, it would have been obvious to one of ordinary skill in the art to combine the fluoropolymer surface of KATAOKA et al and INOUE et al as modified by TAWADA et al with the unevenness described in both KATAOKA et al and NAKAMURA et al because both use this technique to improve efficiency of the photoelectric devices, a desire of nearly all solar cell manufacturing as taught by TAWADA et al. (paragraph 4 of the description of prior art section).

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over KATAOKA et al (US 5,530,264) and INOUE et al (Youichi Inoue, Yasuhiro Yoshimura, Yukiko Ikeda, Akiomi Kohno, Ultra-hydrophobic fluorine polymer by Ar-ion bombardment, Colloids and Surfaces B: Biointerfaces Volume 19, Issue 3, 30 December 2000, Pages 257-261.), as applied to claim 1 above, in view of DINWOODIE (US 6,534,703).

KATAOKA et al and INOUE et al teach the subject matter of claim 1, as shown in the above rejection.

Neither KATAOKA et al or INOUE et al do not disclose the use of the multiple photovoltaic units together.

DINWOODIE teaches "a PV [photovoltaic] assembly, for use on a support surface" including the "installation of the PV assemblies with the PV module at the proper inclination" in the abstract. DINWOODIE shows in figure 21 and 22 and states in column 6, lines 54-55, the common angle of inclination for a PV assembly, or angle 146 in these figures, "is typically about 5 degrees to 30 degrees".

At the time of invention, it would have been obvious to one of ordinary skill in the art, to use the solar cell described in detail by KATAOKA et al in a multiple photovoltaic cell assembly and inclination setup of DINWOODIE so that the collection of energy is increased. Further, it would have been obvious to adjust the solar panel installation inclinations, typically 5-30 degrees as suggested by DINWOODIE, as solar incident rays change based on multiple factors, including the global location and time of the year.

Response to Arguments

8. Applicant's arguments, see page 4 last paragraph to the top of page 5, filed February 14, 2008, with respect to the rejection(s) of claim(s) 1-7 under 35 USC 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of INOUE et al, as INOUE et al teaches a discharge treatment which

modifies the surface of a fluoride polymer to improve hydrophobic properties, in turn increasing resistance to adverse weather like rain or any wet weather.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KOURTNEY R. SALZMAN whose telephone number is (571)270-5117. The examiner can normally be reached on Monday to Thursday 6:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

krs
5/23/2008

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